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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/549,962	09/16/2005	Charles F Kutscher	NREL 03-17	8369
Paul J White NREL 1617 Cole Boulevard Golden, CO 80401				
7550	04/10/2008			
EXAMINER				
DUONG, THO V				
ART UNIT		PAPER NUMBER		
3744				
MAIL DATE		DELIVERY MODE		
04/10/2008		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary**Application No.**

10/549,962

Applicant(s)

KUTSCHER ET AL.

Examiner

Tho v. Duong

Art Unit

3744

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 January 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 18-29, 32, 33, 35-37, 50-61 and 63-65 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 18-29, 32, 33, 35-37, 50-61 and 63-65 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 September 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Applicant's amendment filed 1/10/08 is acknowledged. Claims 18-29,32,33,35-37, 50-61 and 63-65 are pending.

Response to Arguments

Applicant's arguments with respect to claims 18,50 and 57 have been considered but are moot in view of the new ground(s) of rejection.

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the claimed subject matter of "the tab body is non-planar with a larger percentage of the tab body surface area located proximate to the fin body" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet"

pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 50-61 and 63-65 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The claimed subject matter of “due to the forming of the openings the fin body has a surface porosity of less than about 30 percent and has areas of higher porosity provided by the tab pattern proximate to predefined areas of high flow of a cooling gas across the fin body” is not supported by the original disclosure. Applicant discloses on page 8, lines 2-6, that the tabbed fin has porosity of less than about 50 percent and more typically between about 15 and 30 percent. However, this disclosure does not sufficiently support the subject matter as claimed. Regarding claim 50, the claimed subject matter of “a majority of the tabs are arranged with a leading edge proximate to the leading edge of the fin body and substantially parallel to local flow paths in an air flow passage adjacent the fin body” is not supported by the original

disclosure. Applicant discloses (figure) that only a few of tabs (not majority) located proximate to the leading edge.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 57-61 and 63-65 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Regarding claim 57, the claimed subject matter of "due to the forming of the openings the fin body has a surface porosity of less than about 30 percent and has areas of higher porosity provided by the tab pattern proximate to predefined areas of high flow of a cooling gas across the fin body" renders the scope of the claim indefinite since it is not clear whether applicant is claiming that the surface porosity of the fin body is less than 30 percent or higher. It appears that applicant is claiming that the surface porosity of the fin body is less than 30 percent but then later claims the surface porosity of higher on the fin body.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 18-20,23-26,32,33,35, and 50-55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schulze et al. (US 4,997,036) in view of Liu et al. (US 6,349,761). Schulze discloses (figures 1-2) a fin comprising a metallic fin body (2) with a first and second heat

transfer surface (upper and lower surface area of line RLE) and a leading edge; a plurality of tabs (3) bent at an angle 90 degrees from the first and second heat transfer surfaces, wherein each of the tab bodies (3) comprises a substantially planar body with a first end attached to the fin body and a second end distal and unattached to the fin body and wherein the tab bodies are positioned at offset angles, the offset angles for substantially all of the tabs being less than about 20 degrees; there are about 50 percent of the tabs extend from the upper heat transfer surface. Regarding claim 23, Schulze discloses that the tabs (3) are spaced further apart at its rear than its front such that the tabs are less densely distributed in a wake region. Regarding claim 24, the tabs (3) are arranged in rows relative to the leading edge, and wherein in each of the rows a first portion of the tabs extend from the upper heat transfer surface and a second portion of the tabs extend from the lower heat transfer surface, whereby adjacent ones of the tabs in each of the rows extend from different ones of the first and second heat transfer surfaces. regarding claims 25 and 26, each of the tabs (3) extending from a same one of the heat transfer surface area in each of the rows is offset an offset distance relative to corresponding ones of the tabs in adjacent rows, wherein the adjacent ones of the rows are offset relative to each other such that the tabs in the adjacent rows are not coplanar. Regarding claim 32, a minority of tabs on the upper surface being proximal to the tube (tabs closest to the tube) are aligned at an angle relative to the majority of tabs in the lower surface so that gas flowing over the fin body around the tube. Regarding claim 33, the tabs (3) are positioned adjacent the tube to disrupt heat conduction pathways in the fin body that extend substantially parallel to the leading edge away from the tube. Regarding claim 35, a subset of the tabs (3) are positioned at offset angle greater than 20 degrees (relative to the leading edge of the fin) to generate turbulent in airflow across the fin

body. Regarding claim 50, the tabs located in the upper heat transfer surface or in the lower heat transfer surface that are arranged with a leading edge proximate to the leading edge of the fin body and substantially parallel to local flow paths flowing between the tabs. Regarding claim 53, the tab body (3) has a larger percentage of the tab body surface area located proximate to the fin body (the bottom part is wider than the top part). Regarding claim 54, the tab body has an L-shaped cross section since the tab body is bent at 90 degrees from the heat transfer surface area. Schulze does not disclose tube collars for receiving the tubes. Liu discloses (figure 1) that the fin body has tube collars for a purpose of securing the tube to the fin body. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use Liu's teaching in Schulze's device for a purpose of securing the tube to the fin body.

Claims 18-29, 32-33, 35 and 50-52 and 54-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yun et al. (US 5,697,432) in view of A. Y. Gunter (US 3,438,433). Yun discloses (figures 2 and 4-10) a fin comprising a metallic fin body with first and second heat transfer surfaces and a leading edge; tubes receiving in the fin; a plurality of tabs (11) extending at a bend angle from the first and second heat transfer surfaces, wherein each of the tabs comprises a substantially planar body (side body) and wherein the tab bodies are positioned at offset angles; the offset angles (θ_1) being less than about 10 degrees as measured from a simple flow path extending across the fin body substantially perpendicular to the leading edge of the fin body; the offset angles of less than 20 degrees are for substantially all of the tabs at (12a); the bend angle is between about 70 and about 110 degrees as measured from the first or the second heat transfer surface area; the tabs have a height as measured from the first or second heat transfer surface that is less than about two thirds of the predetermined fin separation distance for

the heat exchanger; the tabs are about 50% of the tabs extend from the first heat transfer surface; the tabs are positioned on the fin body such that the tabs are less densely distributed in wake region near the tube collars (behind the collar) and distal to the leading edge of the fin body; the tabs are arranged in rows relative to the leading edge; the adjacent ones of the rows are offset relative to each other such that the tabs in the adjacent rows are not coplanar (offset); the offset angle differ for at least some of the tabs (θ_1 and θ_2) and the offset angle are selected to position the tab bodies substantially parallel with a plurality of predetermined local flow paths for a fluid flowing; the tabs (12b) which are close to the rear of the collar are considered a subset that has an offset angles greater than 20 degree to generate turbulence in air flowing across the fin body. Yun substantially discloses all of applicant claimed invention as discussed above except for the limitation of tube collars and the tab body has a partially curved shoulder at a leading edge. Gunter discloses (figures 1-4) a details of a tab body has a substantially planar body (side of the slit) wherein the tab has a partially curved shoulder at a leading edge for a purpose of forming a smooth transition between different portions of the tab; and tube collars (17) formed on the fin for a purpose of gripping the tube on the fins. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use Gunter's teaching in Yun for a purpose of forming a smooth transition between different parts of the tabs and gripping the tube on the fins.

Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yun or Schulze in view of Stoyntoff, Jr. (US 5,682,784). Yun or Schulze substantially discloses all of applicant's claimed invention as discussed above except for the limitation that the tabs have a surface

roughness greater than heat transfer surface area of the fin body. Stoyhoff teaches of (figures 3-4, 8 and column 2, lines 24-27) a fin a rough surface (30) on louver (32) of the fin body (34) for a purpose of promoting turbulence in an airflow to enhance the heat transfer of the fin. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use Stoyhoff's teaching in Yun's fin or Schulze's fin for a purpose of promoting turbulence in an airflow to enhance the heat transfer of the fin.

Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yun or Schulze in view of Relfe, J (DE 3918610A). Yun or Schulze substantially discloses all of applicant's claimed invention as discussed above except for the limitation that the heat transfer surface area is treated to promote turbulence. Relfe discloses (figures 1-2) a finned heat exchanger that has surface of the fin (1) being roughed up for a purpose of increasing exchange surface area and in addition creating turbulences in the air flow. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use Relfe's teaching in Yun's device or Schulze for a purpose of increasing exchange surface area and in addition creating turbulences in the airflow.

In view of the clarity issue, claims 57-61 and 63-65 are not understood by the examiner to conduct a proper search.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tho v. Duong whose telephone number is 571-272-4793. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tyler J. Cheryl can be reached on 571-272-4834. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Tho v Duong/
Primary Examiner, Art Unit 3744